English

MX 2000

USER'S GUIDE AND MAINTENANCE MANUAL

AFAQ ISO 9001

CE Fabrication française

OLDHAM
DETECTION GAZ / MESURE A L'EMISSION
GAS DETECTION / STACK GAS MONITORING

OLDHAM SA

GAS AND FLAME DETECTION

STACK *GAS* AND *DUST* MONITORING

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We have taken every step to ensure that this equipment continues to give you complete satisfaction.

Please read the instruction manual carefully before using the instrument.

OLDHAM
DETECTION GAZ / MESURE A L'EMISSION
GAS DETECTION / STACK GAS MONITORING

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CONTENTS

I. PRESENTATION 7

II. COMMISSIONING INTO SERVICE 10

1. POWER SUPPLY 10
2. MEASUREMENT CELL : 12
3. REMOTE SAMPLING 13
4. CARRYING THE MX2000 15

III. OPERATION 16

1. OPERATION OF THE INSTRUMENT 16
2. SWITCHING ON 17
3. SWITCHING OFF 18
4. LIGHTING 18
5. USING THE KEYS 19
6. MAINTENANCE MODE 22
7. ALARMS 30
8. ACKNOWLEDGEMENT OF ALARMS 33
9. MEASUREMENT READING 34
10. DISPLAY BRIGHTNESS 36
11. CONNECTION TO A PC OR TO A PRINTER (IBM-PC COMPATIBLE) 37
12. USING THE COM2000 39

IV. THE CR2000 CHARGER 48

1. THE CR2000 - S- CHARGER (NI MH) 48

V. MAINTENANCE AND UPKEEP 49

1. MAINTENANCE 49
2. UPKEEP 51

VI. OPERATING FAULTS 52

VII. TECHNICAL CHARACTERISTICS 53

VIII. LIST OF OPTIONS 57

1. LIST OF PARAMETERS AND OPTIONS AVAILABLE IN THE SOFTWARE OF THE MX2000 INSTRUMENTS 57
2. LIST OF ACCESSORIES 57

IX. APPENDICES 58

1. PARAMETERS 58
2. CHARACTERISTICS OF THE CELL TYPES USABLE IN THE MX 2000 59
3. ACCESSORIES 60
4. SPARE PARTS 60
5. PREPROGRAMMED GAS LIST 61
6. INTERNAL SENSITIVITY COEFFICIENTS LIST FOR MX2000 62
7. COMPLEMENTARY SENSITIVITY COEFFICIENTS TO BE PROGRAMMED ON THE CHANNEL "OTHER GAS" FROM MX2000 63
8. CONSUMABLE PARTS LIST 63

I. PRESENTATION

- The **MX2000** is a portable gas detector. It is one of the smallest 4-risk detectors on the market. It can be equipped with a **"high-luminance" LED** display or a **liquid crystal** display. In either case, it displays messages uncoded and in full.

- It is used for the simultaneous detection of a maximum of **4 gases** present in the air, by means of 4 measuring cells specific to each of the gases which are to be detected.
  The gases concerned can be **explosive** (methane, natural gas, propane, butane, etc.), **toxic** (carbon monoxide, hydrogen sulphide, etc.), or just oxygen.
  The MX2000 has both pulsed and continuous alarms, both audible and visible, and both common and specific to each channel.

- Equipped with a remote manual or electric pumping system and a gas-injection cap, the MX2000 is able to monitor the gas content in the most inaccessible places.

PRESENTATION IN DETAILS

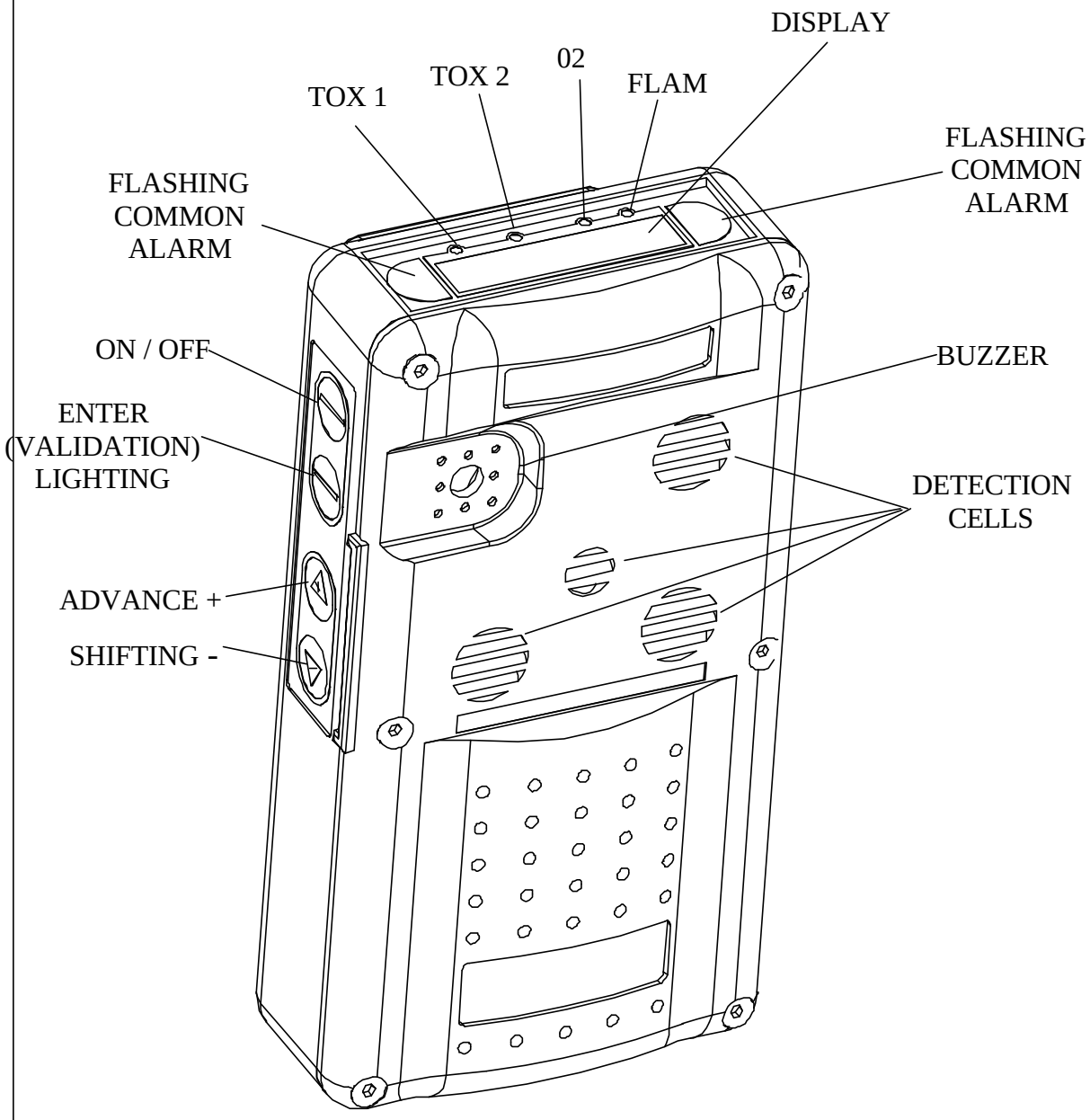


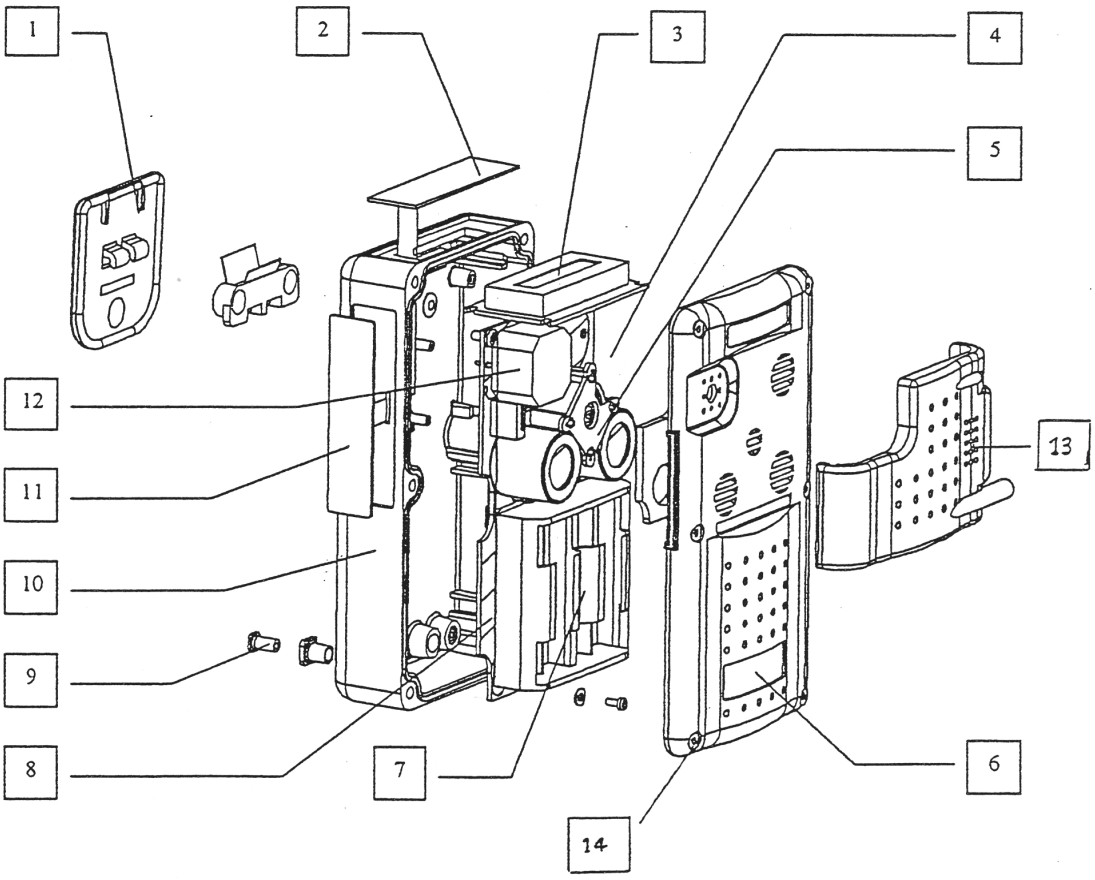
Fig.1

MAKE-UP OF THE MX2000

The MX2000 is fitted with the following elements :

1) rear clip,
2) front panel,
3) display module,
4) explo cell (not shown),
5) electrochemical cells (toxics and oxygen),
6) cover,
7) power-supply pack,
8) main board,
9) external connectors (charging and computer connection),
10) the main housing,
11) switch keyboard,
12) buzzer,
13) gas injection cap,
14) 6 cover retaining screws.

Fig.2



II. COMMISSIONING INTO SERVICE

1. POWER SUPPLY

Several types of power supply are available :

- **pack of four AA type alkaline batteries** (R6, 1.5 V) placed in a battery holder of plastic material (fig.5)
- **pack of four A type or 4/5A nickel metal hydrure rechargeable batteries** (1.2 V) placed in a heat-shrink sleeve (fig.4)

The power-supply pack is connected to the main board by a plug-in connector.
The power-supply pack cannot be changed in a hazardous area.

In normal conditions of use, **battery life** is as follows :

- **12 hours** with a **rechargeable battery pack**
- **15 hours** with a **dry battery pack**

Rechargeable-battery pack

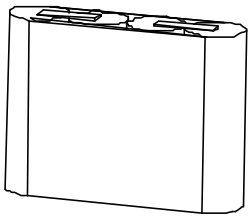


Fig.4

Dry-battery pack

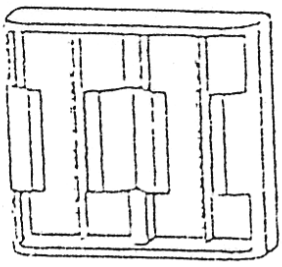


Fig.5

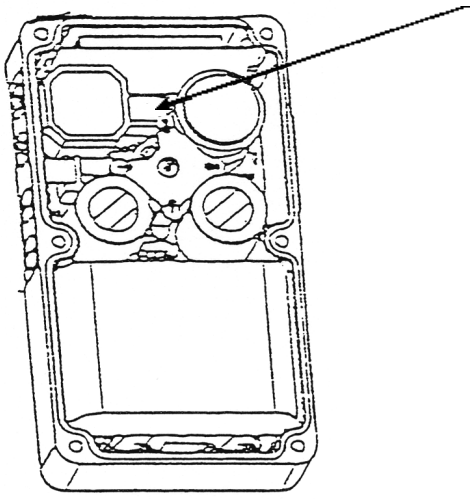
Note: The instrument is **certified** for use in **group I and IIc** explosive atmospheres only when it is fitted with dry or rechargeable batteries of a type recommended by the manufacturer.

- **<u>The data back-up battery</u> (fig.6) :**

- A dry battery (not rechargeable) is used to back-up the memory chips of historics, particularly when the instrument is switched off or when the power-supply batteries have been removed. The **lifetime of the battery** is **5 years.**

<u>Note</u>: The lithium battery of the MX2000 is visible when the cell cover is removed.

Fig.6



- **<u>Installation or replacement of the dry or rechargeable batteries</u>** (to be effected only in a non-explosive atmosphere)

  - switch off the instrument
  - undo the 6 screws of the MX2000 front cover, to reach the housing of the dry or rechargeable batteries
  - replace the battery pack or the dry batteries
  - re-fit the front cover, and do up the 6 screws (using the special spanner supplied in the tool kit)

- **<u>Recharging the batteries</u>**

  - This is done with an Oldham type CR2000 charger. Insert the MX2000 directly into the charger, and leave for a period of about 5 hours (see the chapter 3 : CR2000 charger).

<u>Note</u> : To saveguard a maximum life for the cadnium-nickel batteries, OLDHAM company advocates, in average one time a year, to make a complete* discharge of batteries and to recharge them the maximum possible.

* for example : in using the MX2000 up to have the alarme « battery fault ».

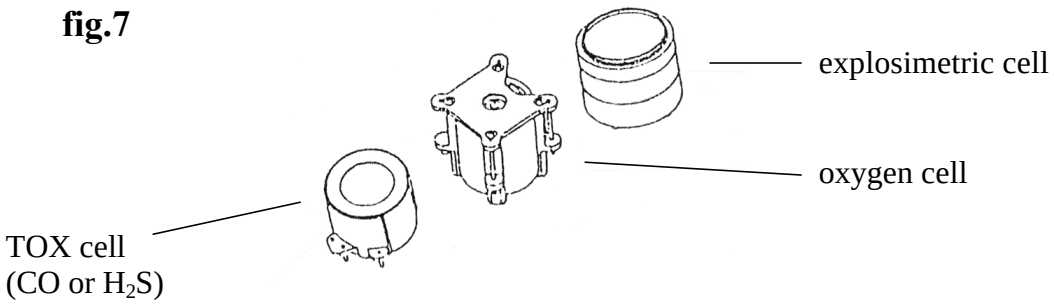
2. MEASUREMENT CELL :

- **Presentation :**

The cells used in the MX2000, which are a vital element of the instrument, must be treated with great care. Mechanical shocks, excessive temperatures or just the entry of water in the course of gas pumping, can be harmful to the quality of the measurement, or may even ruin the cells in extreme cases..

The various cells (explo, O_2, CO, H_2S) are recognisable by their very special shapes and by their clear and uncoded marking as illustrated by the CO and H_2S cells (fig.7). Physically, the cells will always be placed in the same manner. They cannot be reversed (fig.8).

fig.7

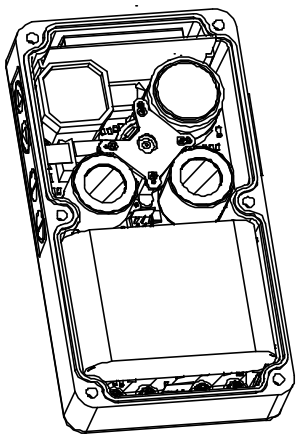


- **Installation or replacement :**

The cells are all of the plug-in type and can be reached when the cell cover is removed, when they can be changed quickly and easily. This operation should be carried out with care in a clean atmosphere :

- switch off the instrument
- undo the 6 securing screws of the front cover
- insert a new cell if necessary, or change a defective cell (refer to the maintenance
- section for the use of menus)
- re-fit the front cover

fig.8



3. REMOTE SAMPLING

- **Presentation**

The measurement or monitoring of gas concentrations prior to entering a cellar or any relatively inaccessible areas can be effected by means of a remote-sampling probe.

- **The systems available**

The systems can be equipped with a rigid or semi-rigid telescopic rod.

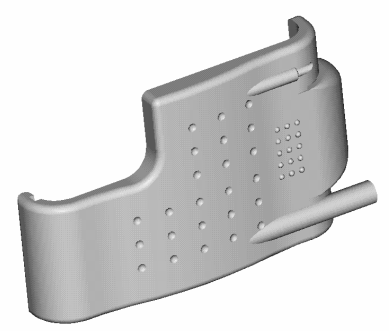
- manual - with intake bulb
- with electric pump

(See fig.11 for example)

Installation of the sampling system

The cap (fig.9) : position the cap on the cell cover of the MX2000. The cap clips into the instrument, which enables it to be fitted rapidly and without the use of tools (fig.10).

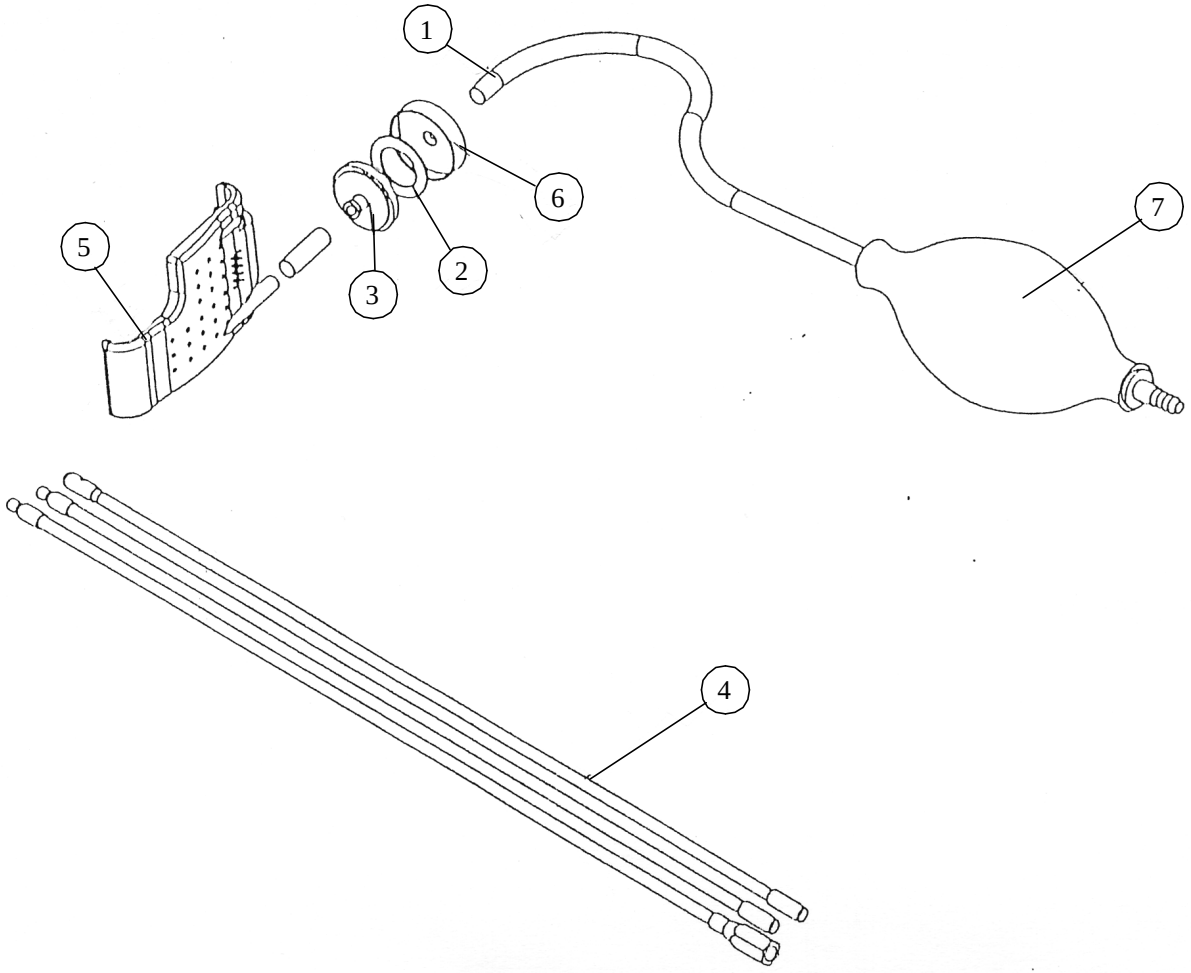
fig.9



- **Sampling system**

Assemble the sampling system used, and then connect the pipe from the water-rejecting filter (2) to the entry of the cap (item 3 on fig.11).

MANUAL REMOTE SAMPLING KIT WITH RIGID PROBE MX2000



N°	DESIGNATION	REF. OFSA
1	Ø5-Ø7Cristal pipe	6115864
2	TX12 ring	6135902
3	CX380 filter	6141141
4	Rigid probe	6327871
5	MX2000 calibration cap	6331119
6	MX21 filter adaptation	6331114
7	160CC pumping handle	6332211

FIG 11

- **Operation**

Pumping and measurement:

With the pumping handle, it is necessary to pump at least 4 times to trigger an alarm if the gas content so requires, and 8 times to obtain a reliable measurement.

Wait for the measurement to stabilise before accepting it. Measurement can be over-estimated (explosive gases) or under-estimated (oxygen) during the pumping process, due to the air movement.

With electric pumping (BP2000 for example...), press the On/Off button to start the process, and wait for a few seconds before taking the measurement.

Removing the pumping system

Never forget to remove the gas entry cap after using the sampling system or after calibration (fig.10).

THIS WILL GIVE RISE TO AN UNDER-ESTIMATE OF MEASUREMENTS, WITH POTENTIALLY FATAL CONSEQUENCES FOR THE USER.

Fig.10

4. CARRYING THE MX2000

Positioning the instrument

1/ The user is able to attend to his work, leaving the MX2000 to monitor the atmosphere in which he is operating (the MX2000 is attached to his clothing by means of a clip, or is carried about his neck by means of the carrying case strap).

2/ The user is able to perform one-off measurements by means of a manual or electrical sampling system.

In order to be able to effect measurements correctly, the cells of the MX2000 must always be clear of all obstructions. If this is not the case, the gas content can be under-estimated, with fatal results for the user.
Even though the user is warned by means of powerful audio signal every 30 seconds, it is vital that he is also in a position to watch the general and special alarm lights.

III. OPERATION

1. OPERATION OF THE INSTRUMENT

This is achieved by means of tactile zones located on the side of the instrument (fig.16).

①	- switching the instrument on and off
②	- validation (Enter) - momentary extra-brightness of lamps - cancellation of alarms - YES
③	- scrolling - numbering
④	- shift - NO

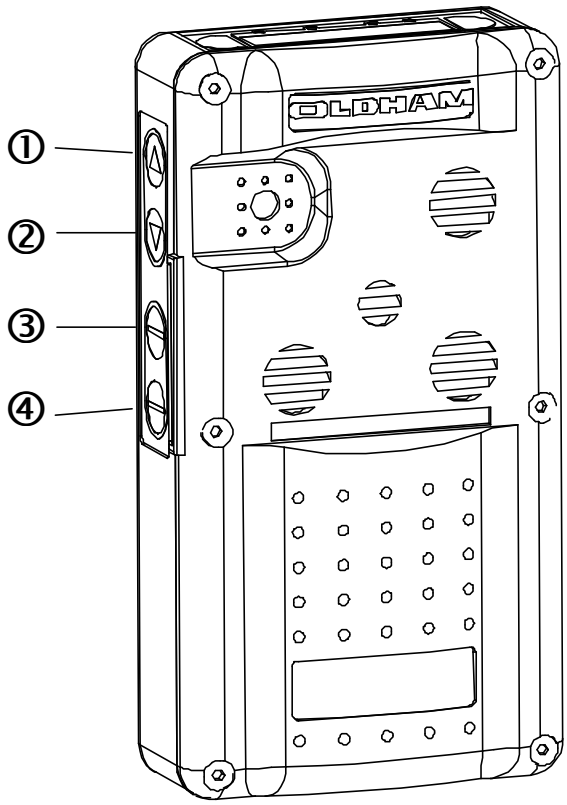


fig.16

2. SWITCHING ON

2.1. Standard switch-on

The MX2000 is switched on by momentarily pressing the

key

A sound and light signal regularly indicates
correct operation of the instrument.

The following appear in succession on the display:

MX 2000	all lights come on
F 1.00	the version number of the software
TEST	self-test running

Then come successively the various channels programmed in the factory:

X-CO	GAS is the type of explosive gas programmed and detected.
X-H2S	X is the value of the detected measurement.
X-GAS	
X- O2	

If a channel is not in service, this is shown on the display.

GAS OFF

2.2. Switch-on with “gas selection” option

If the MX 2000 is equipped with this option, then switch-on of the instrument with selection of the gas to be detected is achieved by simultaneously pressing the

and
keys.

The following then appear in succession on the display :

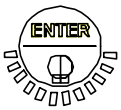
MX 2000 (momentarily)

then

METH %

then every time the key is pressed :

BUTANE **and so on...**

Confirm your choice by pressing: 

The following then appears on the display:

F. X.XX which is the version number of the internal software,

then

TEST followed by normal scrolling of the four channels.

3. SWITCHING OFF

Press the key continuously.

The display then shows the count down **stop 3** **stop 2**

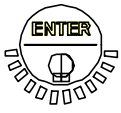
and goes off accompanied by an audio beep **stop 1**

Comment: it is not possible to switch off the MX2000 during its “TEST” phase.

In option, we can have the choice following : it will not be possible to switch off the MX2000.

4. LIGHTING

To increase the brightness of the display:

Press momentarily on the  key

The brightness of the display will return to normal after about 2 minutes.

5. USING THE KEYS

KEY

When this key is pressed momentarily for the first time will appear following the preprogrammed options for example : "Rondier" list first name, the alternated time, the date,…

20 : 22 : 42 or **01 03 96**

Hrs mins secs Date

Pressing a second time brings up:

ACC Volts which is the voltage of the battery pack or dry batteries.

Pressing for a third time results in (for the channels switched on and for the options chosen)

min GAS

alternating with

X LEL

which is the minimum concentration of the explosible gas detected

then in the next press

MAX GAS

X LEL

which is the maximum concentration of the explosible gasdetected, (in % LEL)

- then

MIN 02

X %

the minimum oxygen concentration detected

- and

MAX 02

X %

the maximum oxygen concentration detected (in %)

- **Min CO**
  X ppm
  the minimum CO concentration detected (in parts per million)

- **Max CO**
  X ppm
  the maximum CO concentration detected (in ppm)

- **Min H2S**
  X ppm
  the minimum H_2S concentration detected (in ppm)

- **Max H2S**
  X ppm
  the maximum H_2S concentration detected (in ppm)

- **UEL CO**
  X ppm
  (upper explosive limit) averaged measurement detected for CO (in ppm)

- **UEL H2S**
  X ppm
  Averaged measurement detected for H_2S (in ppm)

•

LEL CO

(low explosive limit) averaged measurement detected for CO

X ppm

•

LEL H_2S

averaged measurement detected for H_2S

X ppm

Comment: Pressing the key causes the brightness of the display to increase.

(1) If the instrument is equipped with the **PATROL** function, the name of the first selected zone appears first (see section on “patrol option”)

KEY

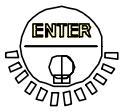
This is a shift key, or it is used to say “no”.

It is also used for scrolling or to say “no” in “patrol” mode

6. MAINTENANCE MODE

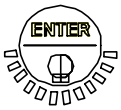
- With the MX2000 in normal operation

- The accessible menus appear in using the key (and/or code (0018))
  - program = programming
  - calib = calibration
  - chg cell = cell change
  - self-adj = self-reset of cells (possible only after 15 minutes of operation)
  - end

- Validate the selected menu by pressing the 

key

THE PROGRAM MENU

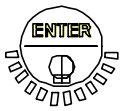
- Do appear **program**
- validate by pressing the 

key
- this brings up: **chan CH4**
- then successive presses on the key bring up

then **chan O2**

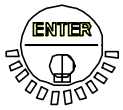
chan CO

then **chan H2S**

- validate the wanted channel by pressing the 

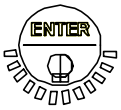
key

EXAMPLE : PROGRAMMING OF FLAMMABLE CHANNEL :

- validate the flammable channel (gas name) by pressing 

- to bring up **ON**

we can thus display **ON** or **OFF** with each operation of

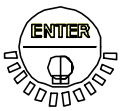
- Validate the position choosen by pressing key 

- If **ON** has been selected

- the following now appears on the display **meth %**

- then by successive presses, the various gases which can be detected by the MX2000 appear.

e.g.: **meth LEL** etc
BUTANE

- validate the gas to be detected by pressing the  key.

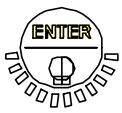
- the display then shows **al X.X** al: the instantaneous explosive alarm threshold.
X.X: the value of the instantaneous threshold.

- choose the value of the wanted trigger level by several successive presses

on the key to bring up the 1st digit, then move by pressing

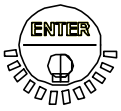
on the key and bring up the second wanted digit (decimal) by pressing

the key

and finally validate everything by successive presses on the key 

- the display then shows **YES NO ?**

The MX2000 asks whether you wish to validate the preceding parameters.

if yes : validate by pressing the 

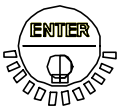
key and the display

then shows **program**

It is now possible to enter another menu by

pressing the key or to return to normal operation

by displaying **END**

Finally validate by pressing the 

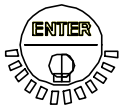
key, and the MX2000 returns to normal operating mode.

if no : validate by pressing the key,

when the display then shows **program**

and it is now possible to re-start the parameter set-up, go into a menu or return to normal operation (read the preceding sections).

THE CALIB MENU

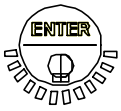
- bring up **calib**
- validate by pressing key 

- the following appears: **CHAN CH4** (for example)
- then successive presses on key bring up

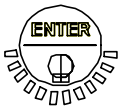
then **CHAN O2**

then **CHAN CO**

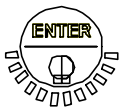
then **CHAN H2S**

- validate the wanted channel by pressing key 

Example **CHAN CH4**

- validate by pressing 

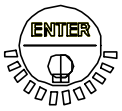
- this brings up **Butane**
- then successive presses on key bring up the reference gas wanted.

- validate by pressing 

- this bring up **CG X.XX**

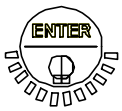
- display the value of the calibration gas which will be used for the calibration, by presses

on the key to increment and on the key to move.

- then validate by pressing key 

- This brings up **– : X.X.X.** (= zero, x.x..x. = value of the zero)

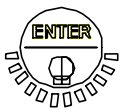
- ensure that you are in a clean atmosphere

- validate by pressing key 

- this brings up **S :X.XX** (S = sensitivity x.x.x. = value of the measurement)

- inject the calibration gas (see section on maintenance and upkeep)

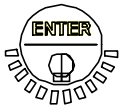
- wait for the measurement to stabilise to ensure that you get a valid reading

- validate by pressing key 

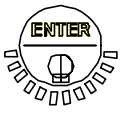
and stop injecting the calibration gas

- the display then shows **YES NO?**

- the MX2000 asks whether you want to validate the preceding parameters:

<u>if yes</u> : validate by pressing key 

and **calib** appears again
It is now possible to calibrate another channel or to enter another menu

If the measurement reading does not correspond to the value either of the zero or of the gas used, due to low sensitivity or incorrect gas injection and if you still validate “yes” by pressing key 

→ the display will show **EXH** and you must then carry out a cell change (exhausted cell)

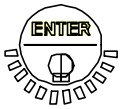
Note: To enter another menu on the way, press key

if no : validate by pressing key

again bringing up **calib** : it is now possible to re-start calibrating or to go to another menu.

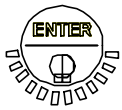
THE CHG CELL MENU

After changing the faulty cell (see section on maintenance and upkeep)

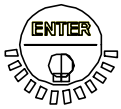
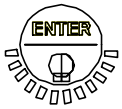
- bring up **CHG CELL**
- validate by pressing key 
- this brings up **CHAN CH4** (for example)
- successive presses on key

then bring up **CHAN O2**

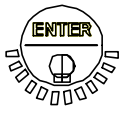
and then **CHAN H2S**

- validate the wanted channel by pressing key 

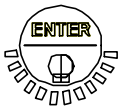
Example : **CHAN CH4**

- validate by pressing key 
- this brings up **Butane**
- then by successive presses on key bring up the reference gas wanted
- validate by pressing 
- this brings up **CG X.XX** (calibration gas and the value)
- display the value of the calibration gas which will be used for the calibration, by

  pressing key to increment and key to move

- then validate by pressing key 

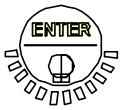
- the display then shows **0 adjust** (zero adjustment)

- validate by pressing key 

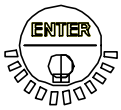
- ensure that you are in a clean atmosphere

- the display then shows **XX : XX** and the 2 lamps come on

"XX" is the position of the 64-step digital potentiometer (automatic zero adjustment)
"XX" is the value of the zero

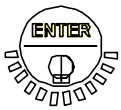
- validate by pressing key 

as soon as the two common lamps go out (fig.1).

If the zero is still not stabilised (lamps are still on) but you still validate the "yes" using key 

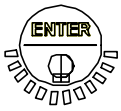
the display will then show **bad adj** and you return to the preceding state to repeat the zero adjustment.

- the display then shows **S adj** (sensitivity adjustment)

- validate by pressing key 

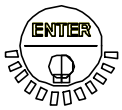
- inject the calibration gas (see section on maintenance and upkeep)

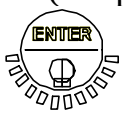
- wait for the measurement to stabilise in order to ensure that the reading is valid (the 2 common lamps are out)

- validate by pressing key 

- the display then shows **YES NO?**

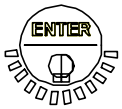
- the MX2000 asks you whether you wish to validate the preceding parameters.

if yes : validate by pressing key 

again bringing up **chg cell**
It is now possible to go to another menu.
If the signal has not yet stabilised (lamps still on), and you still validate the “yes” (using key 

)

the display then shows **bad adj** and you return automatically to the preceding state to re-adjust the sensitivity.

if no : validate by pressing key 

again bringing up **chg cell** , and you can now repeat the calibration or enter another menu.

Note : When the cell change has been completed, if you want to enter another menu (on the way), then press key

THE SELF-ADJ MENU

This is for automatic zero adjustment for all of the cells present in the MX 2000, even including the switched-off channels (OFF).

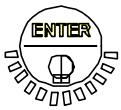
a / when removed from the charger
When the MX2000 is removed from the charger after a charging time of more than 15 minutes, all lamps come on momentarily, together with a short audio signal, and the display then shows

MX 2000
then
SELF ADJ
alternating with several times
TEST
then finally
DONE

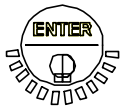
followed by normal cyclical display of the four channels.

b / Manually (using the maintenance access code)
- after a minimum operating time of about 15 minutes

- bringing up the **SELF ADJ** menu

- validate by pressing key 

- the display then shows **YES NO?**

- if yes validate by pressing key 

- the display then shows **DONE**

- then the MX 2000 goes into a normal operating cycle

- if no : validate by pressing key

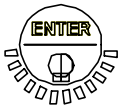
- and the display then again shows SELF ADJ

- to repeat or to enter another menu

THE FINISH MENU

- bring up END by pressing

and if maintenance has been completed and you wish to return to normal operating mode

validate by pressing key 

- and the MX2000 returns to normal mode.

7. ALARMS

These are both visual (lamps/lights and display) and audible (fig.1)

- GAS alarms

According to the programming and the type of gas, the “Gas alarms” can be triggered when the following values are exceeded:

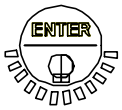
- instantaneous (on 4 channels)
- minimum (on oxygen channel only)
- maximum (on 4 channels)
- Short Term Exposure Limit (STEL) which is a rolling 15-minute mean for each channel equipped with a TOX cell.
- Time Limit Value (TLV/TWA) which is a rolling 8-hour mean for each channel equipped with a TOX cell.

Thus as soon as one channel goes above the pre-set thresholds , the MX2000 delivers a pulsed sound signal. At the same time, the lamp of the channel concerned and the 2 common lamps blink.

Simultaneously, one or more alarm messages appear (O_2 alarm, TLV, STEL, etc.), together with the measurement value.

PULSED LIGHT AND SOUND ALARM:

DISPLAY	CAUSE	REMEDY
AL 02 Alternating with the O_2 measurement **X 02** X is the value of the oxygen measurement	The over- or under-oxygenation threshold has been exceeded	- Sound alarms and common light alarms (can be acknowledged*) - The "O_2" lamp continues to blink as long as the threshold continues to be exceeded.
AL GAS Alternating with the detected gas measurement **X. GAS** GAS is the type of gas detected	The instantaneous threshold has been exceeded	- Sound alarms and common light alarms (can be acknowledged*) - The corresponding lamp continues to blink as long as the threshold remains exceeded
STEL GAS Alternating with the detected gas measurement **X. GAS** GAS is the gas type detected	The STEL threshold is exceeded . STEL is the limit exposure value during a given period (differs according to gas type)	- Sound alarms and common light alarms (can be acknowledged*) - The corresponding lamp continues to blink for as long as the threshold continues to be exceeded
TLV GAS Alternating with the detected gas measurement **X. GAS** GAS is the gas type detected	The TLV threshold has been exceeded The TLV is the mean exposure value during a given period.	- Sound alarms and common light alarms (can be acknowledged*) - The corresponding lamp continues to blink for as long as the threshold continues to be exceeded
disch.	The battery is starting to run down. There remains about 30 minutes-worth of running time.	- Sound alarms and common light alarms (can be acknowledged*)

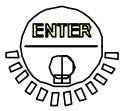
* The alarms are acknowledged by momentarily pressing the key 

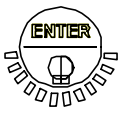
- The FAULT alarms

The faults can be classified into 2 families

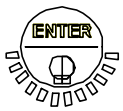
- those relating to the cells (out of range, exhausted cell, etc.). These generate individual messages and a continuous sound alarm.
- those relating to the instrument itself (battery discharged, loss of memory, etc.). The corresponding fault message then appears on the display. These generate a continuous sound and visual alarm.

CONTINUOUS SOUND AND VISUAL ALARM:

DISPLAY	CAUSE	REMEDY
disch.	- Battery discharged: the instrument is no longer usable	- Sound alarm (can be acknowledged)* - Visual alarm (cannot be acknowledged): recharge the battery.
EX RANGE Then **> 5.0 GAS** GAS is the gas type detected	- The measuring range has been exceeded.	- Sound and visual alarms (cannot be acknowledged) in explosive gases: you must leave the hazardous area and switch the instrument off and on again. - Sound and visual alarms (can be acknowledged) in toxic gases and oxygen, by momentarily pressing key  - Exit from the zone
GAS flt GAS is the gas type detected	- Cell faulty or missing	- Sound and visual alarms (cannot be acknowledged) - Switch off the instrument and install or change the cell concerned
	- Calibration unsuccessful - Measurement too negative	- Re-do the calibration: if the fault persists, change the cell
GAS exh.	- Cell worn	- Sound and visual alarms (cannot be acknowledged) - Re-do the calibration
GAS CAL	- Self-zero unsuccessful	- Sound and visual alarms (cannot be acknowledged) - Re-do the calibration
FAULT	- Memory loss - Lithium battery exhausted	- Sound and visual alarms (cannot be acknowledged) - Change the lithium battery, and if the fault persists return the instrument to the factory.

* The alarms are acknowledged by momentarily pressing key 

8. ACKNOWLEDGEMENT OF ALARMS

- **Acknowledgement of GAS alarms** : by pressing key 

momentarily

This consists of **cancelling** the pulsed sound signal and switching off the two common alarm lamps. However, the alarm lamp of the corresponding channel will continue to blink as long as the threshold continues to be exceeded.

- **Acknowledgement of fault alarms** :

If a fault occurs, acknowledgement of the sound and visual alarms is not possible*. Acknowledgement is automatic as soon as the fault has disappeared.

1) It is possible to acknowledge the visual and sound alarm, but only by exiting from the hazardous area when the measuring range has been exceeded for toxic gases or oxygen.

Example of a message in this case :

EX RANGE alternating with **>5.0 GAS** where GAS is the gas type detected

N.B: When the fault alarm (continuous sound and visual alarm) is on, the 2 common alarm lamps, and the sound alarm have priority over the pulsed GAS alarms, then in this case only the channel lamp or the GAS alarm flashes.

2) It is possible to acknowledge the sound alarm when the **Disch.** message appears.

9. MEASUREMENT READING

The MX2000 can be equipped with either a red LED display or a liquid crystal (LCD) display.

- Immediate reading :

The gas content measured by each of the working cells is available on the display. However, as the amount of information required by the bearer is greater than the capacity of the display, the measurements are displayed successively and cyclically, as follows:

X. GAS	GAS is the gas type programmed X is the value of the detected gas measurement
X. 02	
X. CO	
X. H2S	

- If one or more channels are not working, the display then shows the name of the gas followed by OFF.

For example: **02 OFF**

- Deferred reading :

When it is brought into service, the MX 2000 **fitted with an RTC** executes continuous storage of readings in memory. It is thus possible to:

- read the histograms of the stored measurements and events at a later time (with the aid of a PC, the COM2000 software and a CR2000 charger)

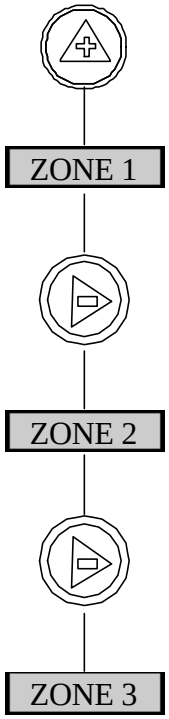
- or to print the histograms (with the aid of a printer, a PC and a CR2000 charger).

THE "PATROL" OPTION

- If the MX2000 is equipped with the "PATROL" function (initialised in the factory) and if the instrument is now in normal operation, the first thing to appear on the display, by pressing key , is the name of the first zone pre-programmed in the factory.

  Then, with each subsequent press on key the names of the other zones appear.

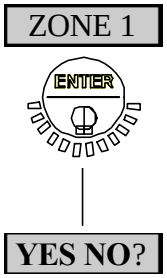
For example:



etc.

- During his round, the user must validate the detection zone (in order to store the measurements taken therein), and this is required at each change of zone.

Example

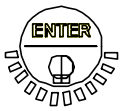


This ends the procedure

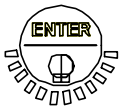
10. DISPLAY BRIGHTNESS

a / With an LED display

The brightness can be increased for about two minutes

by pressing key 

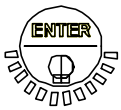
or key

(to look up parameters such as the time, etc.) and in this case one can return to normal brightness by pressing key 

Comment: The display goes to its bright state whenever an alarm is triggered.

b / With the LCD display

The display can be back-lit for a period of about two minutes

by pressing key 

or key

11. CONNECTION TO A PC OR TO A PRINTER (IBM-PC compatible)

Connection of a printer to the MX2000 requires the use of a PC and of the CR2000 charger (which acts as an interface to the MX2000) and using appropriate cables.

The MX2000 holds its data in memory :

- events (alarms, alarm acknowledgement...)
- measurements

The storage interval in respect of values for the historical tables is programmable, and the following table gives the length of storage, depending on this interval.

Putting into memory (per channel) :

Maximum 2 frames and half

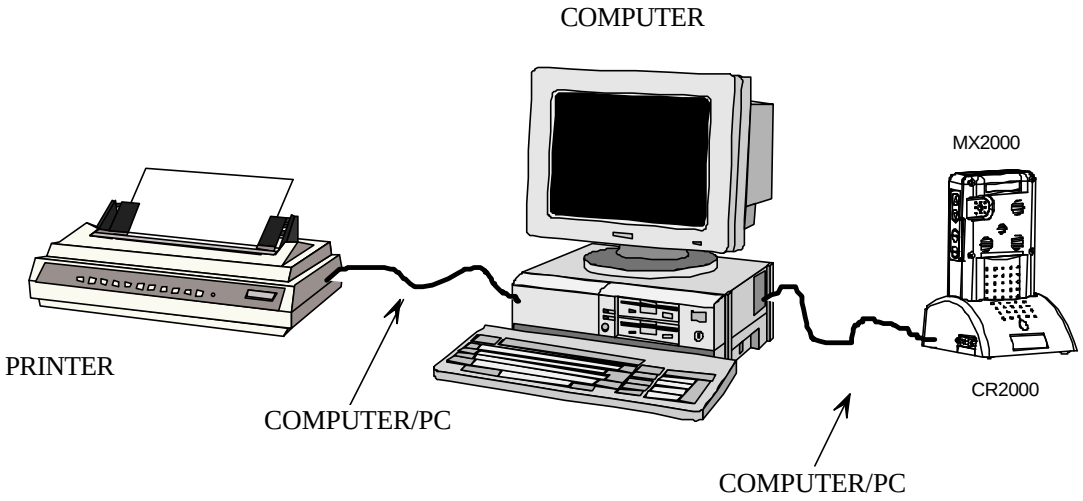
- guarantee storage : 1 frame and half
- measurements number per frame : 960
- lengh of storage : 960 times the interval time

The storage time is determined by the storage interval (see table below) :

Interval	**minimum frame length guarantee**
1 second	24 minutes
2 seconds	48 minutes
5 seconds	2 hours
10 seconds	4 hours
30 seconds	12 hours
1 minute	24 hours
2 minutes	48 hours
5 minutes	120 hours
10 minutes	240 hours
15 minutes	360 hours

- **Connection procedure**

- make the connections according to the diagram below :



- place the MX2000 in the CR2000 charger, which is already switched on (steady green light on)

- check that the LED of the charger goes red, either steady or blinking.

- prepare the PC, using the COM2000.

- switch on the printer, and put it to the “on line” position.

- check the display of the MX2000 shows a discontinuous line indicating that the MX2000 has been on charge for less than 10 minutes.

Reminder: you can connect a PC or a printer to the MX2000 only during the first 10 minutes (discontinuous line)

Using the COM2000 program, in the historical maintenance menu, choose the **printing** mode, and start printing.

(for further details, look up the COM2000 section).

Table of contents :

Connection
Characteristics
Maintenance
Analysis of faults
Histories
Setup

12.1. *CONNECTION*

To make the connection between the MX2000 and the PC, proceed as follows :

- verify that the MX2000 is on - **the MX2000 must be in its charger.**

- check the charger: it must be connected to the power source, and connected to the PC by the serial port,

- check that the communication options have been programmed correctly (selection of serial port and of transmission speed),

- click on the *Connection* button.

➢ SELECTION OF THE SERIAL PORT

The MX2000 can be connected to any serial port, from COM1 to COM4.

The chosen serial port is stored, and used for the next COM2000 start-up.

➢ SELECTION OF THE TRANSMISSION SPEED

With the connection set up, the MX2000 and the PC can communicate at speeds ranging from 1,200 bauds to 19,200 bauds, depending on the hardware.

The transmission speed is stored, and used at the next COM2000 start-up..

12.2. *CHARACTERISTICS OF THE MX2000, current data*

The data displayed on the Characteristics screen are read into the MX2000 and are refreshed once every second for the four channels.

These data are:

- whether a channel is active or not
- the nature of the gas, and its scale,
- the instantaneous value,
- the upper and lower alarm thresholds for the oxygen channel,
- the min and max measurements,
- the LEV and MEV measurements for toxic channels,
- the date last calibrated,
- the date of the last cell change.

If a channel is faulty or switched off, all of its measurements are suppressed.

The characteristics can be saved in a check sheet, or they can be printed.

➢ CHECK SHEETS

These are used to hold the characteristics of the instrument at any given time (current data).

These sheets are saved in a cumulative manner in files with a .CTR extension, meaning that they are stored one after the other.

Movement in this file is achieved by:

- using the Check-sheet menu
- using *Page up and Page down* keys
- using the following buttons:

  First sheet
  Previous sheet
  Next sheet
  Last sheet

You move around within the sheet using the scroll bars.

12.3. *MAINTENANCE WORK*

The Maintenance menu can be used for :

- calibration

- programming

- cell changing

➢ CALIBRATION

Among other things, the maintenance menu is used for :

- calibration of the explo channel,
- calibration of the oxygen channel,
- calibration of the toxic channels.

The operation can be halted at any stage.

▪ CALIBRATION OF THE EXPLO CHANNEL

To carry out the calibration of the explo channel, proceed as follows :

- Check the concentration of the calibration gas proposed.
  If you change this value, it will be stored for the next calibration.
  If the displayed value suits you, click on the *Next* button.

- COM2000 displays the message “zero adjustment in progress...” and displays the value for a check.
  When the zero measurement stabilises and appears to be correct, validate it by pressing the Next button.
  The MX2000 will accept the value if it falls within an acceptable range.

- Then inject the calibration gas at the concentration indicated, as requested by COM2000.
  Press the Next button, and the sensitivity measurement is displayed in the same way as for zero adjustment.

- Validate the operation by clicking the Ok button when the measurement has stabilised.

▪ CALIBRATION OF THE OXYGEN CHANNEL

To perform calibration of the oxygen channel, proceed as follows :

- Place the instrument in pure air, with COM2000 displaying the sensitivity measurement of the instrument.
- Validate the operation by clicking on the Ok button when the measurement has stabilised.

▪ CALIBRATION OF THE TOXIC CHANNELS

To carry out the calibration of a toxic channel, proceed as follows :

- Check the concentration of the calibration gas proposed.
  If you change this value, it will be stored for the next calibration.
  If the displayed value suits you, click on the Next. button.
- COM2000 displays the message “zero adjustment in progress...” and displays the value for a check.
  When this zero measurement stabilises and when it appears to you to be correct, validate it by pressing the Next button.
  The MX2000 will accept this value if it falls within an acceptable range.
- Then inject the calibration gas at the concentration indicated, as requested by COM2000.
  Press the Next button. The sensitivity measurement is displayed in the same way as for the zero adjustment.
- Validate the operation by clicking on the Ok button when the measurement has stabilised.

➢ PROGRAMMING

Among other things, the maintenance menu is used for :

- programming of the explo channel,
- programming of the oxygen channel,
- programming of the toxic channels.

For each channel, you are able to switch the channel on or off by clicking on the corresponding box.

The data relating to this channel will no longer be displayed in the Characteristics window.

- **PROGRAMMING THE EXPLO CHANNEL**

To carry out programming of the explo channel, proceed as follows :

- switch the channel on or off by clicking the In Service box.
- select a gas from the scrolling list offered.
- if you select Other Gas, you must then enter the coefficient to be applied, in the appropriate field.
- then enter the alarm threshold and validate the operation by clicking on the Ok button.

- **PROGRAMMING THE OXYGEN CHANNEL**

To carry out the programming of the oxygen channel, proceed as follows :

- switch the channel on or off by clicking on the In Service box.
- enter the upper and lower alarm thresholds, and validate the operation by clicking on the Ok button.

- **PROGRAMMING THE TOXIC CHANNELS**

To programme the « TOX » channel, proceed as follows :

- switch the channel on or off by clicking on the In Service box.
- select a gas from the scrolling list proposed.
- then enter the alarm threshold, and validate the operation by clicking on the OK button.

➢ CHANGING A CELL

The maintenance menu is used, among other things, for changing a cell in the COM2000.

In a first stage, for all channels, the COM2000 requires a message of confirmation before it will run the zero calibration procedures for the new cell.

When the cell is replaced and the request validated, the COM2000 begins the changing a cell procedure.

12.4. *FAULT ANALYSIS*

The events are indicated in priority order.

A scrolling list allows all the lines to be examined if the screen is too small.
The list of faults can be saved with the ODEF extension.

The following is a list of some faults which can occur :

FAULT	REMEDY
- during calibration, the zero is too shifted	→ repeat the calibration procedure
- during calibration, it is no longer possible to measure at the limit of the scale.	→ repeat the calibration procedure
- following calibration, the cell is exhausted	→ replace the exhausted cell
- after self-adjustment, the measurement is too shifted to allow for automatic correction	→ repeat the calibration procedure
- after changing the explo cell, the zero has been set incorrectly	→ repeat the calibration procedure
- after changing the explo cell, the sensitivity has been set incorrectly	→ repeat the calibration procedure
- the battery is low	→ recharge it

12.5. *HISTORIES*

The histories are composed of frames, which themselves are composed :

- of the measurement part which indicates the gas concentration at any time
- of events which may have happened during the frame (scale exceeded, cell stopped, etc.)

You can look at the archived histories by entering the name of the file, with the HIS extension, to be opened by COM2000.

You can then carry out the analysis of a frame.

▪ ANALYSIS OF A FRAME

The histories can be viewed :

- either in text mode
- or in graphical mode

Here you must first choose one single frame for display, by selecting it either using the mouse or by means of the scroll bar.

The scrolling list for frame selection then gives :

- the serial number,
- the setup of the instrument (for example : EXP, O2 , CO, H2S),
- the start date and time
- the end date and time.

When the frame has been chosen, and the mode established, validate the operation by clicking on the *Ok* button.

▪ THE TEXT MODE

When the histories are in text mode for the analysis of a frame, the dates, times, and successive gas concentrations are shown in chronological order (the oldest at the top).

A scrolling list is used to display the lines if the screen is too small.

▪ THE GRAPHICAL MODE

When the histories are in graphical mode for the analysis of a frame :

- the title, the date and the time are shown at the top.
- the chronological order of events is shown on the abscissa (X axis), the gas concentrations on the ordinate (Y axis).
- the gases are shown in colour.

The scales for the various gases are optimised automatically, in accordance with the gas concerned, to achieve the best view.

By clicking on the icons of the various gases, you display or mask the corresponding plot.

You are also able to select any particular part of the graph in order to zoom it.

12.6. *SETUP*

You can modify the display mode (measurement or detection) and load the time and/or the date of the MX2000.

The *Code* button enables you to alter the access code.

The *Patrol* button can be used to alter the patrol list.

Note : All modification of setup « purges » the histories.

- **CHANGING THE ACCESS CODE**

  After clicking the *Code* button in the Setup section, proceed as follows to alter your access code :

  - enter your current code (4 digits) and validate by pressing the *Enter* key,
  - enter your new code and validate either by pressing the *Enter* key or by clicking on the *Ok* button.

  If you forget your code, please contact OLDHAM.

- **ALTERING THE PATROL LIST**

After clicking the *Patrol* button in the Setup section, you can alter the order and the content of the patrol list.

Any alteration of the patrol list will result in a purge of all histories.

To add a patrol, enter his name (8 characters maximum) then either click on the *Add* button or press on the *Enter* key (30 patrols maximum).

To remove a patrol from the list, select the name, and either click on the *Delete* button, or double-click it.

To reset the list, either press on the *Del* key, or click on the *Delete all* button.

To change the order of the list, click on the desired position and move it by keeping the mouse button pressed (drag it). When you reach the chosen location, release the mouse button and the moved position will be inserted there.

Validate the operation by clicking on the *Ok* button.

IV. THE CR2000 CHARGER

1. THE CR2000 - S- CHARGER (Ni MH)

The charger is intended for charging the MX2000 equipped with a pack of nickel metal hydride type (Ni MH) batteries.

1.Steady green light

- The charger is switched on but there is no MX2000 on charge.
- There is an MX2000 on charge, but it is fully charged.

2.Steady red light

- The charger is in its fast charging cycle.
- The current delivered is 120 mA for a period of 14 hours.

3.Blinking red light

- The charger is in the float charge cycle (I ≅ 30 mA)

Comment: If the MX2000 is removed from the charger and then re-inserted, during a cycle, the charger goes into the fast charging cycle (steady red) for a certain time, and then returns to the float-charge cycle.

N.B The MX2000 is switched on automatically when it is inserted into the CR2000 charger.

4. The CR2000 charger type - S - is equipped, on its side, with female a Sub-D connector for connection to a PC.

MX2000 display	
- - - - - - - -	A discontinuous line appears on the display. The MX2000 has been on charge for less than 10 mins. It is possible to connect a PC. If the MX2000 is removed from the charger, it goes into the **TEST** mode, and then to normal operation.
.....	The MX2000 has been on charge for more than 10 mins. A dotted line appears, and the 4 alarm LEDs come on successively and cyclically.

It is not possible to connect the PC.

If after 20 mins on charge, the MX2000 is removed from the charger. It passes into self-adjust mode, then to **TEST** and finally to the normal cycle.

V. MAINTENANCE AND UPKEEP

Important !

The only means of checking that the instrument's detection function is working properly is the **calibration** performed with the help of a **standard gas**.

This "recommended" standard gas is specified on the label of the detector. Nevertheless, some other standard gas may be used on referring to the table of coefficients: Chapter VIII of this manual.

Hence, calibration mus be carried out :

- Every 6 months minimum
- After an exposur at high gas concentrations
- After more than one month storage with no use
- After a module change
- Following an instrument fault

1. MAINTENANCE

A maintenance program built into the instrument enables you to alter the alarm thresholds easily, and to carry out calibrations or cell changes without difficulty.

- Self-adjustment

  To be performed regularly, and especially after a cell change.
  This procedure must be carried out in a clean atmosphere. Otherwise, the sensitivity of the cell is liable to be defective.

  Reminder : This takes place automatically whenever the MX2000 is removed from the charger after 10 mins of charging.

- Calibration

  Calibration is the only way of checking the detection function, and is done using a calibration gas.
  Calibration must be carried out every three months and whenever the instrument has been exposed to excessively-high concentrations of gas in use. This also applies to an instrument which has been stored for a long period.

  → It is possible to carry out this procedure using the MX2000 alone (calibration menu) and using the **COM2000** program**. The calibration menu** enables the cell to be calibrated automatically, during a cell change for example, and when setting the zero and the sensitivity of the cell. Follow the directions provided by COM2000 (help screens p.45).

- Calibration procedures on the MX2000 :

  For each channel, calibration consists of setting the zero in clean air and the sensitivity with calibration gas.

- Zero adjustment in clean air : follow the procedure on p. 28

- Setting the sensitivity

  - Clip the gas injection cap onto the MX2000 (fig.9 and fig.10) in the cell zone.
  - connect the tube from the calibration kit, and inject the gas at a maximum rate of 60 litres per hour.
  - then follow the “calibration” procedure.

Note : When the calibration procedure has been completed, do not forget to remove the cap from the MX2000

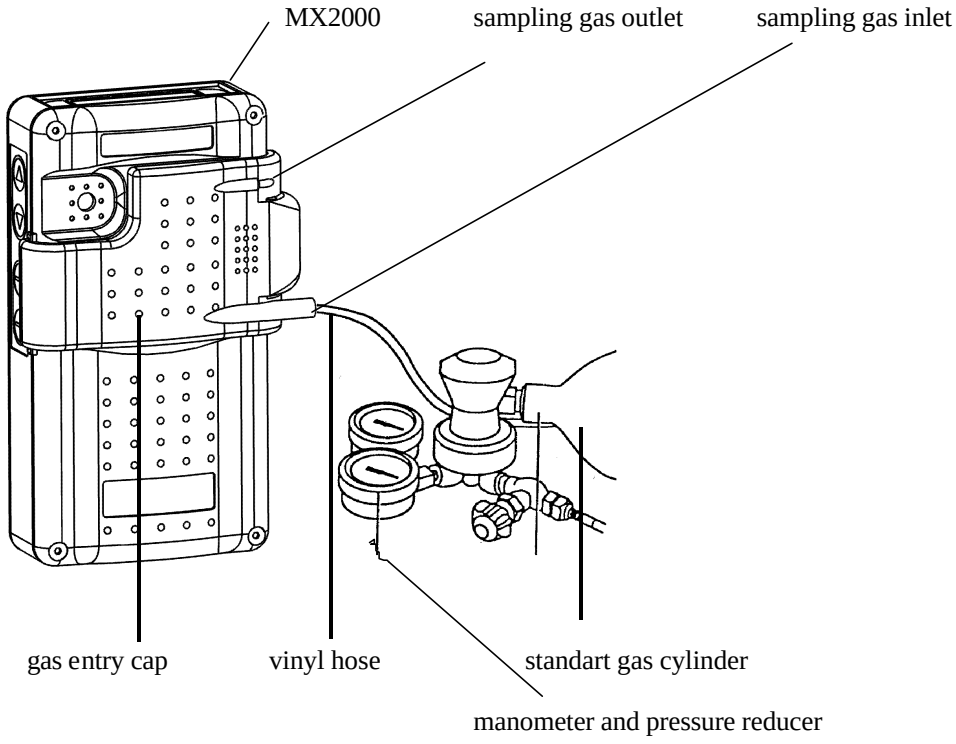


Fig.13 : Connection of calibration items

2. UPKEEP

- Re-charge the batteries or change the dry batteries regularly (outside of classified areas).

- The lithium battery should be changed every 3 to 5 years.

- For users with the COM2000 software, this operation must be carried out by **authorised staff** only.

- Unscrew the cell-cover screws.

- Remove the lithium battery, located alongside the tube, and insert a new battery *

- Re-program the date and the time with the COM2000 software.

- Re-mount the cell cover, and do up the screws.

- For users without the COM2000 software, send the instrument to a distributor or directly to our head offices.

* The instrument is certified for use in an explosive atmosphere only if it is equipped with dry or re-chargeable batteries of a type recommended by the manufacturer.

VI. OPERATING FAULTS

SYMPTOMS	CAUSES	REMEDIES
- The screen shows nothing, if there are no further audio beeps.	- Battery exhausted. - Battery pack discharged. - Instrument faulty	- Change the battery. - Re-charge the battery pack. - Return the instrument to the distributor.
FAULT appears, with a continuous sound and visual alarm cannot be reset	- Memory loss and lithium battery exhausted.	- Change the lithium battery and if the fault persists, return the instrument to the factory.
DISCHARGE appears, with a common, continuous sound and visual alarm, which can be reset.	- The battery is starting to run down and only about 30 minutes of use remain.	- Re-charge the battery pack or change the dry batteries.
DISCHARGE appears, with a common, continuous sound and visual alarm (cannot be acknowledged)	- The battery is discharged and the instrument is no longer usable	- Re-charge the battery pack or change the dry batteries
GAS EXHAUST appears with a sound and visual alarm (cannot be acknowledged)	- Cells exhausted	- Switch off the instrument and change the cell concerned.
EX RANGE appears and then > 5.0 GAS - with a sound and visual alarm (cannot be acknowledged) in explosive gases. - with a sound and visual alarm (can be acknowledged) in toxic gases and 0_2 gas	- The measuring range has been exceeded - The measuring range has been exceeded	- It is necessary to exit from the hazardous area, and switch off the instrument, then switch it on again. - It is necessary to exit from the hazardous area
GAS CAL appears with a sound and visual alarm (cannot be acknowledged)	- Self-adjustment unsuccessful	- Repeat the self-adjustment procedure or change the cell
- IMPOSSIBLE appears	- Self-adjustment not possible	- Move to a clean atmosphere and repeat the self-adjustment procedure
- The measurements are negative	- Zero not set	- Perform a self-adjustment procedure
GAS Deft appears GAS : is the gas type detected. Sound and visual alarm (cannot be acknowledged)	- Cell defective or missing - Calibration unsuccessful - Measurement too negative.	- Insert or change the cell concerned, after first switching off the instrument - Perform calibration once again. If the fault persists, change the cell

VII. TECHNICAL CHARACTERISTICS

- *Manufacturer* : OLDHAM S.A. - 62 ARRAS FRANCE
- *Function* : MULTIPLE RISK DETECTOR
- *Type* : MX 2000
- *Gas detected* : Explosive (25 gases pre-programmed; see the list in appendices), O2 - CO - H_2s (see table of cell characteristics)

- *Configuration* : 1 to 4 risks
- *Measurement* : Continuous

- *Mode* :
  - Detection (Display of “ok” or “gas”)
  - Measurement (Display of the concentration in full)

- *Cell* : plug-in type for the change

- *Display* :
  - 8-character LED, alphanumeric, located on the top (with high luminosity)
  - LCD (with backlight)

- *Self-zero* : Automatic on removal from the charger, or manual

- *Cell fault* (at starting)
  - Visual and audio alarm
  - Uncoded display

- *Battery fault :*
  - Visual and sound alarm
  - Uncoded display

- *Check on correct operation :*
  - Audio signal every 30 seconds for the correct operation (adjustable frequency)
  - Self test when switched on, and when removed from the charger

- *Indicators* :
  - 1 alarm lamp for each channel
  - 1 common flashing alarm

- *Pulsed visual and sound alarms :*
    - 1 instantaneous threshold on adjustable explosimeter
    - 2 instantaneous thresholds on oxygen
    - 1 instantaneous alarm threshold
    - 1 TLV alarm threshold
    - 1 STEL alarm threshold as toxicity meter

- *Sound alarm* : 85 dB at 30 cm

- *Outputs* : Charger

- *Power supply* :
    - 4 dry batteries, R6 1.5V
    - 1 Ni MH rechargeable batteries

- *Battery life* : 12 hours with NimH rechargeables batteries and 15 hours with dry batteries

- *Re-charging time* : 14 hours (Ni MH)

- *Miscellaneous* :
    - Operation by keyboard, 4 tactile keys.
    - Charger: 220 V AC single phase, or 12 V DC
    - Maintenance menu

- Sealing : IP 66
- Case : Stainless-steel fibre polycarbonate-filled
- Weight : 450 g (battery included)
- Working temperature : -20°C to + 45.0°C
- Dimensions : 80 x 150 x 40 mm
- Volume : 480 cm^3
- Maximum relative humidity : Up to 95%

CE marking followed by the european regulation 94/9/CE

OLDHAM Arras
CE 0080
MX2000
Ex I M1 II 2 G
EEx ia d I EEx ia d IIC T3 or T4 LCIE 02ATEX6054X
Do not open and don't recharge accumulators in an explosive atmosphere.
Don't open and don't change druy batteries in an explosive atmosphere.
Serial number and year of construction

Note : Under the using ATEX group II, the temperature classification T3 or T4 depends the instrument power supply. When an instrument is fitted with dry batteries or with an rechargeable battery-pack indicated T4, the temperature classification will be T4. With other types of pwer, the temperature classification will be T3.

CE marking followed by the european regulation CEM 89/336/CEE

Métrology :

Testing of characteristics made by DMT (Deutsche Montan Technologie), report n° PFG – Nr – 41300298 :

- Followed by EN 50054 and 50057 scale 0 à 100 % LEL CH4
- Followed by EN 50104 scale 0 to 25 % oxygen,
- Followed by Din T017 scale CO and H2S

Approvals :

CSA : N° LR 104516 C22.2 N°152 Ex ia T4 CLASS I, Groups A, B, C, D
GOSSTANDARD : ROSS FR.GB.05.B00597 PO Ex iasI 1 Exibd IIC T4 X

- AFAQ ISO 9001
- CSA Class I – Group A, B, C et D

OLDHAM
DETECTION GAZ / MESURE A L'EMISSION
GAS DETECTION / STACK GAS MONITORING

DECLARATION DE CONFORMITE
Declaration of conformity

CE

La **Société OLDHAM S.A.**, ZI Est 62000 Arras France, atteste que le matériel neuf destiné à être utilisé en Atmosphères Explosives désigné ci-après:
*(The **Company OLDHAM S.A.**, ZI Est 62000 Arras France, declares that the following new material intended for use in Explosive Atmospheres:)*

Détecteur de gaz *(Gas detector)* MX2000

est conforme aux exigences des Directives Européennes suivantes :
(comply with the requirements of the following European Directive :)

I) DIRECTIVE EUROPEENNE 94/9/CE du 23 mars 1994
relative aux Atmosphères Explosives
The European Directive 94/9/CE of 23 march 1994
Concerning the Explosive Atmospheres

Normes harmonisées appliquées : *(Harmonised applied Standards)*	EN 50014 de juin 1997 + amendements 1 et 2 EN 50018 de novembre 2000 EN 50020 de août 1994 EN 50054 de janvier 1996 EN 50057 de juillet 1993 EN 50104 de janvier 1996 EN 60529 de juin 2000 EN 50303 de juillet 2000
N° de l'Attestation CE de type du matériel : *(N° of EC type examination certificate)*	LCIE 02ATEX6054X
N° de la Notification Assurance Qualité de Production de l'usine de fabrication de Arras : *(N° of the Production Quality Assurance Notification of the Arras factory)*	INERIS 00ATEXQ403
Délivrés par l' Organisme notifié sous le numéro 0080: *(Issued by the Notified Body n°0080)*	INERIS, rue Taffanel, 60550 Verneuil en Halatte, France.

II) DIRECTIVE EUROPEENNE 89/336/CEE du 3 mai 1989
relative à la Compatibilité Electromagnétique
The European Directive 89/336/CEE of 3 may 1989
Concerning the ELECTROMAGNETIC COMPATIBILITY

Normes harmonisées appliquées : *(Harmonised applied Standards)*	EN 55022(94), ENV 50140(93), CEI 801-2(91) CEI 801-4(88)
Essais effectués par (Tests issued by):	AEMC, 665 rue de la Maison Blanche 78630 Orgeval France
N° des rapports d'essais *(N° of tests reports)*:	N° 95286 (18/12/95)

CE/ATEX105

Arras, le 06/12/02

Le Représentant de l'entreprise
On Behalf of the firm

Lionel Witrant

AFAQ

Directeur Technique
Technical Director

VIII. LIST OF OPTIONS

1. LIST OF PARAMETERS AND OPTIONS AVAILABLE IN THE SOFTWARE OF THE MX2000 INSTRUMENTS

Options
STEL / TLV (TWA) : allows storage or not of the STEL and TLV.

Detection : normal or Gas operating mode.

For the next two options, the MX 2000 must have been operating for at least the time given by the stabilisation variable. This allows a self-zeroing to be carried out on cells which have been operating for some time.

Self-zero on removal from charger : if this option is programmed, a self-zero is done automatically when the instrument is removed from the charger.

Manual Self-zero : allows the user to do a self-zero on the instrument itself.
The user must go into the maintenance mode on the MX 2000 in order to gain access to this option.

Identification : this option validates the patrol function. If this option is validated, then the current patrol can be altered by pressing key once.

Changing the current patrol creates a new record frame in the histories.

Switch-off disabled : this option prevents the instrument being switched off, unless any doubt is removed or switch-off is enabled again.

Time / date : gives the time in hours, minutes and seconds.
gives the date in days, months and years (the last 2 digits) (only the MX 2000 with internal Real-Time Clock).

Location list : list of names of the zones visited in the“patrol” function (memory space for 30 names of 8 characters).

2. LIST OF ACCESSORIES

- - leather case 6121528
- - key « allen » 6145737
- - gas introduction nozzle 6331119
- - computer interface 6315831
- - transformer 6111189
- - charger 6511140

IX. APPENDICES

1. Parameters

Parameter	Unit	Excursion	Typical value	Comment
Time-out	second	1 to 65535	600 s (10 mins)	From the moment when the user places the MX 2000 into its charger, this is the time during which the user is allowed to connect to the instrument, for maintenance purposes.
Beep	second	2 to 65535	30 s	The interval separating two instrument correct operation beeps.
Stabilisation	second	1 to 65535	600 s (10 mins)	Minimum running time of the instrument before a self-zero can be done (manual or on removal from the charger).
Storage interval	second	1 to 900	60 s (1 min)	Storage interval of values for the histories
Test period	second	1 to 65535	15 s	At switch-on, this is the time during which the min, max alarms are not enabled.

2. CHARACTERISTICS OF THE CELL TYPES USABLE IN THE MX 2000

	Explo	**O_2**	**CO**	**H_2S**
Standard range	100% LEL	30% vol	500 ppm	100 ppm
Minimum detectable	1% LEL	0.1% vol	1 ppm	1 ppm
Accuracy	< 3%	< 0.3% vol	< 5%	< 5%
Zero drift	< 3%	< 0.1% vol	< 2%	< 2%
Response time	20 s	< 10 s*	30 s	30 s
Lifetime	48 month	18 month	48 month	48 month
Guarantee	12 month	12 month	12 month	12 month

* time to activate the alarm at 18% vol.

3. ACCESSORIES

Name	References	
EXPLO cell	6313 530	
O2 cell	6313 531	
CO cell	6313 535	
H_2S cell	6313 536	
Gas injection cap	6331 119	
Ni MH. S charger	6511 141	
Carrying bag	6121 528	
Hexagonal male spanner	6145 737	
PC lead	6116 026	
Gas calibration kit (in 6.8 l)	Air Zero	6128 746
	Methane 2.5%	6128 741
	CO 300 ppm	6128 748
	H_2S 30 ppm	6128 786

4. SPARE PARTS

Name	Reference
Cover screws	6336 973
Cell cover	6123 545
Housing	6121 269
LED circuit display	6451 375
Main circuit, “RTC” version	6451 380
Main circuit, “STD” version	6451 374
Lithium battery	6111 174
Dry battery support block	6352 346
LR6 dry batteries	6111 147
Keyboard	6122 432
Front panel	6122 433

5. PREPROGRAMMED GAS LIST

- % methan
- LIE methan
- butan
- propan
- natural gas
- ethylen
- pentan
- hexan
- propylen
- acetylen
- ethanol
- aceton
- propylen oxyd
- ethylen oxyd
- isobutan
- dimethyl (dymethylether)
- ethyl acid (ethyl acetat)
- 2 - butano (2 - butanone)
- isopropan (isopropanol)
- xylen
- toluen
- super es (1 - 3 butadien)
- hydrogen
- other (other gas)

6. INTERNAL SENSITIVITY COEFFICIENTS LIST FOR MX2000

GAZ	FORMULE BRUTE	LEL	COEFFICIENTS CH4
ethylen Acetat	$C_4H_8O_2$	3 %	1,35
Aceton	C_3H_6O	2.15 %	1,3
Acethylen	C_2H_2	1,5 %	1,1
Butan	C_4H_{10}	1,5 %	1,5
1,3 - Butadien	C_4H_6	1.4 %	1,25
2 - Butanon	C_4H_8O	1,8 %	1,5
Dymethylether	C_2H_6O	3,0 %	1,55
Ethanol	C_2H_6O	3,3 %	1,1
Ethylen	C_2H_4	2,7 %	1
natural Gas	CH_4	5 %	1,1
Hexan	C_6H_{14}	1,2 %	1,6
Hydrogen	H_2	4,0 %	0,55
Isobutan	C_4H_{10}	1.5 %	1.5
Isopropanol	C_3H_8O	2,15 %	1,3
ethylen Oxy,	C_2H_4O	2,6 %	2,1
propylen Oxy,	C_3H_6O	2,3 %	2
Pentan	C_5H_{12}	1,4 %	1,35
Propan	C_3H_8	2,0 %	1,2
Propylen	C_3H_6	2,0 %	1,1
SP95Super	/	1,1 %	2,3
Toluen	C_7H_8	1,2 %	1,7
Xylen	C_8H_{10}	1,0 %	2.6

7. COMPLEMENTARY SENSITIVITY COEFFICIENTS TO BE PROGRAMMED ON THE CHANNEL "OTHER GAS" FROM MX2000

GAS	General formula	LEL	UEL	Vapour density	Coef / CH_4	Calib.gas recommended
Benzene	C_6H_6	1.2 %	8 %	2.7	2.7	But/Prop
Cyclohexanone	CH_2 $(CH_2)4C$	1.3 %	9.4 %	3.4	3.2	But/Prop
Petrol ("super")	Mixture	1.3 %	6 %	> 2	2.1	But/Prop
Ethane	C_2H_6	3.0 %	15.5 %	1.04	1	
L.P.G.	Prop + But	1.65 %	≅ 9 %	1.85	1.48	But/Prop
Diesel	Mixture	0.6 %	≅ 6 %	> 4	5	But/Prop
Kerosene (JP4)	$C_{10} – C_16$	0.7 %	5 %	> 4	7.5	But/Prop
Methanol	CH_3 OH	5.5 %	44 %	1.1	0.8	
Methylamine	CH_3NH_2	4.9 %	20.7 %	1.1	1.05	
Octane	C_8H_{18}	1.0 %	6 %	3.9	1.7	But/Prop
Styrene	C_8H_{12}	1.1 %	8 %	3.6	2.5	But/Prop
White spirit	Mixture	1.1 %	6.5 %	> 2	3	But/Prop

8. CONSUMABLE PARTS LIST

Designation	Reference
- Ni mH pack battery	6311079
- dry battery	6111147
- oxygen cell	6313531
- explo cell	6313530
- CO « CY » cell	6313535
- H2S « CY »cell	6313536

CAUTION : Consumable parts will have to be garanted from OLDHAM S.A. origin, otherwise, equipment safety will not be assured.

Please detach and destroy this slip after having commited your code to memory

Your secret code is : **0 0 1 8**

OLDHAM SA - GAS DETECTION DIVISION

LIMITED WARRANTY

As per sales conditions

RELIABILITY - CONTROLS

Your satisfaction is our primary concern. This means our equipment and our technical departments must be reliable, and the quality of our production is essential to achieve that reliability. Quality is ensured by extremely strict verifications carried out during production, at the end of manufacture and before shipment. (All shipped equipment is configured to meet your requirements). These steps help to save time during equipment start-up and avoid additional costs.

START-UP

Entrusting the start-up of your equipment to our expert technicians gives you the guarantee of additional safety.

FIELD SERVICING

Our AFTER-SALES SERVICE technicians are ready to service your equipment very quickly on your site. This performance is made possible by the efficient network of our branches throughout the world.

For any specific technical question, please contact our Service Responsible person, Mr. MIGUEL RIESGO, 00 33 3 21 60 80 86.

FACTORY REPAIRS

For any problem which cannot be solved in the field, a team of SPECIALIZED TECHNICIANS is on hand to ensure the quick repair of your equipment sent to our plant in ARRAS, France. In this way, **OLDHAM SA** undertakes to keep the downtime for your equipment to a minimum.

MAINTENANCE CONTRACT

REGULAR MAINTENANCE IS NEEDED to ensure that your equipment meets the stipulated performance levels, as well as to guarantee the safety.

OLDHAM SA CAN offer you MAINTENANCE CONTRACTS.

TRAINING

OLDHAM SA has a **fully-equipped TRAINING Department**: a number of engineers specialized as instructors, conference rooms, equipment available for practical exercises, computer equipment, display equipment, etc..

You are thus assured that your personnel will receive all the **TRAINING REQUIRED** to use our equipment and perform first-level maintenance. This training can cover our entire product range.

OLDHAM SA organizes **SCHEDULED TRAINING SESSIONS** (1 week) at the head office in **ARRAS**. **Special training** programs can however be set up at the head office or on your site.

QUALITY

With the assurance that we comply with **ISO STANDARDS**, our users can have complete confidence in **OLDHAM SA QUALITY**.

ADVANTAGES

OLDHAM SA is represented in major countries worldwide with sales and service centers.

OLDHAM SA uses all the modern means of communication, such as e-mail, fax and Internet.

OLDHAM SA is always present at large trade events, i.e. regional, national and international **EXHIBITIONS**.